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Contagious Abortion.

Mr. Stockman's lecture upon this disease, and the subsequent discussion with the members of the Royal Counties' V.M.A., is worthy of careful reading by all practitioners. The discussion alone, which brought out such facts as the infectivity by ingestion of contagious abortion with its obvious bearing upon the generally accepted theory of infection by the bull, and the prevalence in this country of contagious vaginitis, merits more than passing notice. The lecture is far more important. Practically it is a *resumé* of the work of the Committee which, for some considerable time past, has been engaged upon contagious abortion.

That work has resulted in some valuable discoveries, and methods have been devised in the laboratory which afford good grounds for the hope that we may soon be able to cope with the disease successfully wherever it exists. But more extensive trials in the field are necessary before their value can be finally estimated, and to this end Mr. Stockman invites the co-operation of practitioners.

The bearing upon the various methods for diagnosis, prevention, and cure, of the valuable bacteriological discoveries of the Committee should be noted. By overcoming the former difficulties in cultivating the abortion bacillus, the Committee cleared the way for methods of inoculation; and the discovery that the organism can be grown without forming clumps renders it possible to apply the agglutination test. The agglutination test alone would probably have been very helpful in diagnosis, despite its limitations; but the two other diagnostic methods described by Mr. Stockman—the "fixation of the complement," and the subcutaneous injection of "abortin" appear much more important at the present moment.

Both these methods have been found satisfactory from laboratory experiments and a few observations outside the laboratory; both now require more extensive trial in the field before their real value can be appraised. There certainly should be no lack of response to Mr. Stockman's proposals to carry out the one test in a certain number of cases and provide material for the other. The first—"fixation of the complement" test can only be performed by an expert pathologist in a laboratory, but the material to be tested can be easily collected and forwarded by any practitioner, the only requisite being a due regard for asepsis.

The Abortin test is more applicable to the needs of practice, and can be performed by any practitioner—being, in fact, analogous to the tuberculin test, with some differences in procedure with regard to dosage and the times for taking the temperatures. With truly scientific caution, Mr. Stockman merely described "abortin" as "very hopeful." We do not expect that it will be found infallible in practice any more than mallein and tuberculin have been; but the incalculable value of the two latter agents tempts us to form high hopes of Abortin.

Mr. Stockman did not speak very hopefully regarding curative treatment; but, as a method has already been devised which is "hopeful" if used sufficiently early, it seems possible that, if the diagnostic methods are finally found reliable, the results of curative treatment will be found more favourable. At present, however, the most hopeful measure appears to be preventive inoculation. Mr. Stockman described the Committee's method, which has given excellent experimental results, which can easily be applied by any practitioner, and which, like the diagnostic methods, now requires the further test of clinical observation under the ordinary conditions of farming.

We are now asked to co-operate in making the test. Abortin for diagnosis, and material for preventive and curative inoculation, will be supplied free to veterinary surgeons who are in a position to make observations and will undertake to furnish detailed reports of the results. Many veterinary surgeons will be glad to do this, but some will probably have difficulties in inducing their clients to co-operate on precisely the lines advocated by Mr. Stockman. Undoubtedly Mr. Stockman's plan is the best to follow at the present moment; but some farmers—as Mr. Stockman evidently foresees—will ask for all their animals to be treated and immunised, and thus detract from the value of the observations. Others, again, will take fright at the frankly experimental character of the procedure, and refuse to co-operate at all. Nevertheless, if veterinary surgeons will exert themselves a little, a sufficient number of farmers will be induced to try the new methods, and in due time the Committee will have statistics enabling them to pronounce definitely upon the value of each.

Even at the present moment, it is not premature to congratulate the Committee upon considerable valuable additions to scientific knowledge as regards contagious abortion—additions that cannot fail to aid all future research upon the subject, even if the practical measures now under trial do not fulfil expectations. But it certainly appears quite possible that those measures, when fully tested, may render the diagnosis and prevention of the disease at least an easy task for the practitioner. The more promptly practitioners avail themselves of Mr. Stockman's proposals—which form an excellent illustration of the inter-dependence of the clinician and the experimental pathologist—the sooner we shall know exactly how far the Committee have succeeded in dealing with contagious abortion.

A CASE OF RABIES IN A PUPPY.

A fox terrier puppy dog two months old was reported to me as having been worried and bitten by a strange dog a month before. Two days previous to being reported the puppy had become strange in its manner, and rushed and snapped at its master, biting him on the bare foot. It continued its strange behaviour in the room in which it was shut up. It was willing to feed but seemed unable to do so.

I found the above symptoms and, in addition, distended pupils, partial blindness, partial paralysis of the jaw and hind quarters, it made repeated rushes at objects placed in its way, falling exhausted and foaming, renewing the rushes after a short interval of rest.

I shot it and found on post-mortem examination the brain slightly anæmic but congested in spots; spinal cord damaged by shot; pharynx, larynx, and trachea slightly congested; stomach empty, except for about half ounce detritus of matting and a little charcoal; kidneys slightly congested; spleen congested.

As the symptoms ante- and post-mortem were compatible with a diagnosis of rabies the owner proceeded to the Pasteur Institute for treatment.

F. E. Place.

Mandalay.

ABSTRACTS FROM FOREIGN JOURNALS.

National Federation of Horse Industries.

This movement is now attracting considerable attention in France, and to those who, like ourselves, live largely by the utilisation of the horse, it cannot fail to be of interest.

This Federation has sent the following letter to all the Local Councils throughout France:—

"*To the Chairman and Members of the Council:*

We have the honour to send and recommend to your kind attention the following documents, which at the re-assembling of Parliament will be sent to the Public authorities in the name of 600,000 French workers, exclusive of innumerable farmers and breeders, employed in the utilisation or sale of horses.

This petition has been unanimously adopted by our Federation and we ask you, in your turn, to view it favourably and thus associate yourselves with us.

We would also point out to you that the adoption of suitable regulations issued by the Minister of Public Works to protect the public against the terrible abuses of automobilism is not the only measure that those engaged in the horse industry have the right to demand. Actually, their interests are in every respect and on all occasions sacrificed to motor traffic, which none certainly would wish to hinder, but which ought not to benefit by harmful privileges to the detriment of horse industries infinitely more necessary to the country and more profitable to agriculture and national defence.

It is thus that the roads having been everywhere damaged by the continuous traffic of enormously heavy and very rapidly moving motors, not only must the considerable cost be borne by the whole community but the plans for their re-making, actually adopted, appear to be exclusively inspired by the one idea of providing further facilities to the motors for greater speed and freedom of travel.

None among the road authorities and State officials appear to think that these new advantages accorded to 30 to 35,000 chauffeurs are most likely to be antagonistic to the security and convenience of 1,600,000 vehicles and horses and to millions of pedestrians who, using the roads of France and paying for their upkeep, have as much right to this advantage as those to whom this particular consideration is shown.

In regard to the law, we call your attention to this point, that in case of an accident the horse proprietor is "presumed in fault" and responsible for damage caused by his animal, unless he can show that the accident was due to chance or was unavoidable (Art: 1385 of the Civil Code). The owner of a motor, on the contrary, when his machine has caused an accident, is not, by the law, declared responsible. To obtain civil redress *the victim must prove that the motorist has committed some fault.* This proof is usually impossible, and it either prevents the injured person sueing, or leads to the judge dismissing the case. We ask you if it would not be more equitable, and a matter of commonsense to establish against motorists the same presumption of fault as against drivers and horsemen. More especially as a machine should be more under control than a horse. And, is there not urgent need, on this point, to introduce into the civil code an addition which its authors could not have thought of, but which they would certainly have incorporated if automobilism had existed in their time.

Finally, we protest generally against the privileges of all kinds, irritable abuses which the representatives of the motor industries and sports constantly receive from public officials. Have we not seen to assure the success of their sports entire regiments mobilised on whom was imposed extra work and risks in no way related to national defence. Application of those interested in horses for a small number of soldiers to assure order at the racecourses have been refused.

Wherefore, we request you, gentlemen, to give us your assistance in expressing the opinion that "Parliament and Public Bodies should at once take the necessary steps to put an end to the unfair privileges by which automobilism benefits to the deteriment of animal traction both in an administrative and legislative sense."

Our Federation is convinced that you will favourably receive its request. It does not seek to minimise the seriousness of the opposition which will be evoked. The motor associations have already given evidence of the influences which they have at their command both in the press and on public bodies. Nevertheless we are satisfied that you will take an unprejudiced view of the matter and that we may trust you to ignore these influences under whatever form they present themselves, and that you will not wish to sacrifice the interests of the immense majority of your electors. These last will be exceedingly grateful to you.

In thanking you in advance for your kind consideration of our protest we beg you to accept, Mr. Chairman and Gentlemen of the Council, the assurance of our respectful consideration."

600,000 workers in answer to a petition of the Automobile Association against the proposed law dealing with motor traffic brought in by the Minister of Public Works, have sent to Members of Parliament, through their Associations, the following counter petition:

"Sir,—The various articles appearing in the Press relative to the Minister of Public Work's proposed law to control the motor traffic, together with the pretentions of the Automobile Association have induced, on the part of the Associations of Horse Industries, a reply to the

allegations, more or less well founded, and to the exaggerations contained in these articles.

The motor industry, which for all purposes styles itself "eminently French" is surely not more so than our ancient industries which for many centuries have furnished a living to generations of workers, the number and importance of whom has never been surpassed by the thousands constantly paraded by those interested in the motor industry.

The necessity for the maintainance of our old industries "truly national" is clearly demonstrated from the point of view of national defence; for the workers engaged in them are indispensable to our Army. The breeders who raise the horses needful for the Army, as well as those employed by them, have, as much as any, the right to seek the aid of the Public Authorities in insisting that they should not be sacrificed to a new industry which, without doubt, possessing merit and utility and constituting an advance in locomotion by facilitating (at great cost) long distance travelling, ought not to be free to crush all.

The farmers whose crops feed the horses employed in trade or belonging to private persons have as much right to call their business national as the motor manufacturers, and the number of hands employed by them is quite as important as those employed by these last. As to the fabulous number of workers concerning which the motor manufacturers speak, it is certain it would cut a sorry figure by the side of the number exclusively employed in horse industries. The list below will give some little idea of the personnel, employers and workers, so occupied.

Harness makers (2 or 3 in a commune)	70,000
" " (2 or 3 assistants)	100,000
Shoeing smiths (2 or 3 in a commune)	100,000
" " (4 or 6 assistants)	160,000
Veterinary surgeons and assistants	20,000
Corn dealers and assistants	25,000
Saddle makers and allied industries	15,000
Jobmasters, coachmen, ostlers	140,000
Horse dealers and those employed by them Riding masters " " " " "	20,000
Total	650,000

We thus arrive at a minimum of six hundred and fifty thousand persons, without counting the farmers who claim the right to work and live.

There is still another argument of primary importance, this is the interest of the public, the pedestrian, and of all those who use the roads of Paris, either by carriage, horseback, or bicycle, of all those who travel the roads of France, and who have the right to be protected from the recklessness of the too numerous chauffeurs and those who possess the means to live at a distance and travel according to their tastes and needs.

These are some of the rights which are absolutely ignored by the whole of the motor personnel, both manufacturers and chauffeurs. We trust, sir, that the enumeration of the more important interests to which we call your attention will lead you to support the provisions of the Bill submitted to Parliament by the Minister for Public Works.

We beg you, sir, to accept our respectful salutations."

National Federation of Horse Industries and the Allied Agricultural and Breeding Interests.

Nature, Object, Place.

Art. 1.—There is formed in Paris, in conformity with the law of July the 1st, 1901, under the title of "The National Federation of Horse Industries and the Allied Agricultural and Breeding Interests," an Association of the various agricultural, industrial, commercial, and other societies dealing with the breeding, sale, and utilisation of horses in France.

Art. 2.—This Association, absolutely non-political, has for its object the consideration of all questions affecting the above-mentioned societies, and the taking of co-operative action in defence of common interests. Its main purpose is to defend the horse industries against all the dangers which menace them to the great detriment of agriculture and National defence, to demand from public authorities consideration and protection at least equal to that enjoyed by mechanical transport, to seek new openings and to establish between producers and their auxiliaries an effective solidarity.

Art. 3.—The headquarters of the Association to be at Paris, 3 Rue de Lutecè, City. This may be altered at the will of the Committee.

Composition, Budget.

Art. 4.—This Federation consists of representatives of the various Associations, Societies, and Unions interested in home industries, who assent to the regulations of the Federation. They form part of it although wholly retaining their entire autonomy.

Each Society to be represented by two members. Exceptionally, persons whose work, experience, and counsels are deemed useful to the Federation may be admitted as ordinary or honorary members.

The Federation may confer the honorary title of President on eminent personages: the admission of members and associations lies with the Committee.

Art. 5.—The amount of the annual subscription is not fixed, but is not to be less than five francs for the individual, 50 francs for a society of more than 25 members, and 25 francs for a society whose membership is below this.

Organisation, and Direction.

Art. 6.—A general meeting of the Federation shall be held at least once a year. A report will be presented of the work of the past year together with the balance sheet and all matters relating to the objects of the Federation, whose place in the order of the day has received the assent of the Committee, will be discussed.

Art. 7.—The Federation is represented as concerns the public, by a committee possessing the fullest powers. This Committee is elected for two years by the general meeting, and shall be eligible for re-election.

The Committee shall elect, from among its members, a suitable number of Vice-presidents, a Secretary, a Treasurer, and any other necessary officials.

Art. 8.—Provincial branches may be formed subject to the approval of the Committee. These will be controlled by their own Committees, acting in harmony with a central committee

Art. 9.—The first Committee of the Federation shall be elected at the general meeting of the founders of the present Association. At this meeting absentees may vote by proxy on signed instructions to the founders.

A further regulation with regard to future voting will be drawn up by the Committee, both as to the number of votes any allied society shall possess and also how these societies shall be represented. This regulation when drawn up shall be ratified at the next general meeting, which will vote this time also as at the nomination of the first committee.

Dissolution.

Art. 10.—The dissolution of the Federation can only be voted at a special meeting of the Committee. Three-fourths of the voters must be in favour of this dissolution. In case of dissolution the Committee shall take the necessary steps for liquidation and matters relating thereto.

President, Roduwart; Vice-presidents, Mollereau, Camille Lazart; Secrétaire-Géneral, Duneufgermain; Trésorier, Grollet.

W. F. W.

ACUTE DIETETIC ECZEMA IN COWS.

Nissen (*Maanedskrift for Dyrlaeger*) records an observation of this nature in milch cows.

Twenty-one cows were removed from the meadow in warm dry weather in June and tied up in one cowshed. About eight days later, the first symptoms of disease appeared, nineteen cows becoming affected about the same time. A few days later—about a fortnight after the animals had been tied up—Nissen first examined them.

At the first glance, Nissen was inclined to suspect foot-and-disease or some other contagious affection. After a more accurate examination and an enquiry into the history, he diagnosed the outbreak as one of acute dietetic eczema, very similar to those already described by Bang, Stribolt, and Andersen as appearing after feeding with fresh clover and cotton cake simultaneously. The cows under notice had been upon this diet since tying up.

The nineteen affected cows showed fever and diminution of appetite, and had lost one-half their yield of milk. The limbs were more or less swollen up to the knees and hocks, and rising, lying down, walking, and standing caused pain to the animals. The skin was covered at these swollen parts, and also at the inner side of the tibial region and on the udder (with the exception of the teats), with a cohesive, yellowish, coagulated, serum-like exudate, which glued the hairs together. This discharge did not arise from vesicles, but originated in a direct exudation from the skin. When the thick, scab-like masses of exudate were removed, the exposed skin was found to be reddened, swollen, and sensitive. The fore limbs were less severely affected throughout than the hinder extremities.

The digital cleft was unaffected; no exudate was to be seen in this region, and the skin covering it also appeared quite normal.

In some cows an insignificant "eruption" could be found upon the skin of the belly in front of the udder.

Other animals showed the characteristic eruption about the ischial region, the vagina, the neck, and the mouth.

In the buccal cavity itself lesions were in comparatively slight evidence. Two cows, however, showed a diffuse yellowish croupous layer upon the mucous membrane of the lower lip, extending to the gums. In some cows the mucous membrane of the palate had a peculiar appearance. In these cases a yellow croupous streak was found behind each of the bars of the palate; this was difficult to see, as it was partially hidden by the palatine bar projecting in front of it. If the tongue was drawn far out of the mouth, the same superficial croupous layer could be seen upon the posterior part of the fraenum. A few cows showed some dribbling from the mouth.

Six or eight of the cows suffered at the same time from a considerable purulent conjunctivitis. The cornea, however, was completely clear in all the animals.

The cowshed was comfortable, clean, and well ventilated. The nineteen affected animals stood in two rows opposite one another; they were fed together, and since being housed had received large coarse red clover with the addition of three pounds per head of cotton cake. The two unaffected cows were stalled together somewhat apart from and cross-wise to the rest; they were fed separately, but received the same food as the others. Strange to say, these two were and remained healthy.

Before being housed, the cows had been eating the same kind of clover in the meadow without the addition of cake, and had shown no signs of illness. Ten cattle which remained on the meadow and continued to eat clover without cake remained healthy.

Acting upon his diagnosis of dietetic eczema, Nissen immediately changed the food, and also instituted symptomatic treatment—employing lead lotion against the eczema, and boric lotion against the conjunctivitis. The result convinced him that his diagnosis was correct. Two days after the change of diet a quite striking improvement in the condition of the cows was evident, and this continued until, two or three weeks, after the beginning of the treatment, the disease had quite disappeared.

Nissen says that some cows would probably have succumbed without the change of diet. In conclusion, he repeats his conviction that the disease was dietetic and not contagious, admitting at the same time, however, that the exemption from illness of the two above-mentioned cows is a singular circumstance.—*Berliner Tier. Woch.*

THE PRESENCE OF BACTERIA IN NORMAL ORGANS

Conradi, in *Die Münchener Medizinische Wochenschrift*, describes some extensive researches he has made to determine the frequence of the presence of bacteria in normal organs and tissues. His results are not in accordance with the views which have hitherto been most generally accepted.

Conradi's observations were made upon normal organs of cattle and pigs. He used larger quantities of tissue than has been customary in similar investigations, and devised a somewhat elaborate bacteriological technique to exclude contamination of the material by air-borne bacteria, and to encourage

the growth of any germs which might be present in small numbers in the tissues. Altogether he investigated 162 pieces of tissue, taken from 150 animals; and he found that 72 of these 162 samples contained bacteria.

The liver was by far the most frequently infected organ, 42 out of 63 pieces of liver which were investigated (or two-thirds of the total) containing germs. Bacteria were also found in 18 out of 59 pieces of muscle and in 6 out of 19 kidneys, the proportion of infected organs in each of these cases thus being about one-third. Four out of five lungs, one out of four lymphatic glands, and one out of eleven spleens also contained germs.

Bact. coli commune, Bact. lactis ærogenes, Streptococcus acidi lact., Bact. mesentericus, Bac. fluorescens non liquefaciens, Diplococcus pneumoniæ (Fränkel), and *Bac. suipestifer* were all identified culturally in the foregoing order of frequence. The *Bac. suipestifer* was found on four occasions, viz., deeply situated in the muscles of two pigs and one bovine, and in the kidney of a pig. Anærobic bacteria were very often found.

These researches indicate that bacteria are frequently present in the normal organs, and that these bacteria are generally inhabitants of the intestine which become absorbed in the same manner as the food.—*Berliner Tier. Woch.*

Lactosuria in Milch Cows.

Sieg (*Archiv für wissenschaftliche und prakt. Tierheilkunde*) has been investigating the frequence of sugar in the urine of milch cows, and the variety of sugar present. In these researches he has never been able to demonstrate the presence of any sugar other than lactose, and he found that lactose was present in the urine of 38 out of 68 milch cows.

Lactose is very often found in the urine of cows far advanced in pregnancy, and is probably always to be found at the time of parturition. The lactosuria is physiological, appearing from over-production of milk sugar in the mammary glands during parturition. Usually the lactosuria diminishes gradually until it completely disappears, but in some cows the urine yields lactose during the whole period of milking.—*Berliner Tier. Woch.*

W. R. C.

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION.

An ordinary general meeting was held at the New Laboratory of the Board of Agriculture, Alperton Lodge, Alperton, on Friday, the 30th July. In the unavoidable absence of the President, Mr. E. Lionel Stroud, Mr. Stewart Stockman, vice-president, occupied the chair. Members present: Messrs. R. C. Tennant, A. L. Butters, John Hatch, R. Page Bull, S. H. Slocock, H. G. Lepper, R. Roberts, T. M. Hunt, W. T. Broad, G. E. King, W. A. Hancock, D. Wyllie, P. J. Simpson, G. P. Male, W. G. Wragg, W. Wilson, James East, J. Varney, J. F. Simpson, H. G. Simpson.

Visitors: Messrs. H. P. Standley, Norwich; T. E. Auger, Wymondham; W. S. Mulvey, London; J. R. Jackson, London; Dr. V. A. Moore, Cornell University; Capt. Carr, A.V.S.

The minutes of the previous meeting were taken as read and confirmed.

The following members wrote regretting their inability to be present: Messrs. E. Lionel Stroud, E. Lawrence, A. Broad, Prof. McCall, J. S. Hurndall, F. G. Samson, C. Wood Page, T. D. Hughes, T. B. Goodall, W. Hunting, Mellett, W. Shipley, Major Cranford, R. F. Wall, Ford, J. C. Coleman, F. Bazley, and J. A. Todd.

Correspondence.

A letter was read from Mr. A. Broad, of Finchley Road, resigning his membership on account of the difficulty of attending the meetings.

On the proposition of Mr. A. L. Butters, seconded by Mr. Slocock, the resignation was accepted with regret, Mr. Slocock suggesting that some means might be devised whereby a man who had been a member of the Society for a number of years could have some easy terms given to him in order to continue as an honorary member for life.

A letter was also read from the Hon. Secretary of the Central Veterinary Medical Society enclosing resolutions passed by that Society in connection with the Milk and Dairies Bill.

The Hon. Secretary said the R.C.V.S. was dealing very seriously with the Bills and the interest of the profession was not being lost sight of by the Council. He suggested that the meeting might go into Committee in order that the question might be discussed *in camera*.

Mr. Roberts seconded the motion, which was carried.

The discussion of the matter having concluded, the general meeting was resumed.

Mr. East moved that the whole matter be left in the hands of the Council who he felt sure would do the best for the interest of the profession.

Mr. Butters seconded the motion, which was carried.

A communication was read from the Secretary of the R.C.V.S., acting as Honorary Secretary to the National Committee in connection with the Ninth International Veterinary Congress at the Hague in September.

A communication was also read from Dr. Bradley of Edinburgh, in connection with the amalgamation of Societies.

The Hon. Secretary reported that the delegates had attended a meeting at Harrogate on the 6th July when a resolution was passed to the effect that the President and Secretary of each Veterinary Medical Society should form a Committee, to be called together on some future occasion, to consider the details of the suggested amalgamation. Mr. Slocock and Mr. Samson who had attended as delegates had prepared a short report.

The Hon. Secretary thought the better way would be to have a proposition that the President and Secretary of the Association should act upon the Sub-Committee.

Mr. Wilson asked whether that would bind the Association to the principle of amalgamation, because he objected to amalgamation.

Mr. Butters moved that the President and Secretary be appointed to act upon the Sub-Committee, and that the matter be discussed at the next meeting of the Association.

Mr. Tennant seconded the motion, which was carried.

A letter was read from Mr. Awde, the Secretary of the South Durham and North Yorkshire Veterinary Medical Society, with regard to the question of payment of fees to veterinary surgeons attending race meetings, asking that some concerted action might be taken to charge uniform fees for such services.

Mr. TENNANT did not think there was any recognised fee' and mentioned the fees paid to him at Ascot and Windsor.

Mr. LEPPER thought the question was one between each race committee and the veterinary surgeons who were asked to attend.

Mr. P. J. SIMPSON proposed that the Secretary should be instructed to acknowledge the latter and to state that the Association had considered the matter, but thought it was a subject which should rest between the veterinary surgeons and the management of the meeting.

Mr. BUTTERS seconded the motion, which was carried.

A discussion took place with regard to certain dental instruments being purchased for the Association, and it was agreed, on the motion of Mr. A. Broad, seconded by Mr. King, that the Hon. Sec. should obtain a selection of instruments for the consideration and approval of the members at the next meeting.

NOMINATIONS FOR MEMBERSHIP.

Mr. H. P. STANDLEY, President of the Eastern Counties Veterinary Association: moved by the Hon. Sec. seconded by Mr. P. J. Simpson.

Mr. W. S. MULVEY: moved by Mr. P. J. Simpson, seconded by Mr. Butters.

On the motion of Mr. Tennant, seconded by Mr. A. L, Butters, it was agreed that the next meeting should be held in London.

[Mr. Tennant then took the chair.]

ON CONTAGIOUS ABORTION IN CATTLE.

ADDRESS BY Mr. STEWART STOCKMAN.

I do not propose to go through the report which has been recently published as it is much too big a subject to take up in one lecture, and as it is in print it can be easily obtained. But I think some of the more practical questions might be of immediate interest to the members of this Association, particularly in relation to diagnosis and preventive methods, such as they are, and other matters that veterinary surgeons will have to deal with in the field.

With regard to the bacteriology of this disease, amongst other things the Committee have devised methods by which it becomes a very easy matter to grow the bacillus of abortion. There is no need, as was previously believed, to pass oxygen through the cultures and maintain a certain tension of oxygen. It is certainly a little difficult sometimes to obtain a first culture, say, from the uterine exudate, on artificial media, but it is not always difficult; in fact it is sometimes very easy on certain media which we have employed, and once you have the artificial culture growing you can pass it on indefinitely from tube to tube and obtain a strain of bacillus that grows with increasing ease on ordinary media in the ordinary way, that is to say, like an aerobe.

We have found, however, some very characteristic things about this bacillus to which I should like to draw attention. I do not know yet that all of them possess a great practical bearing in the field, but they are certainly of considerable importance in the Laboratory. We have shown for instance, that you can quite easily, from cultures at least, obtain growths on potato, and a most remarkable thing is, that although the growth is not as quick as that of the glanders bacillus, once it is formed, it is practically impossible to tell with the naked eye a culture of the abortion bacillus from one of the glanders bacillus, although, of course, under the microscope you can see morphological differences at once. We have also found that it can be subcultured very well on the surface of agar, and what is still more important, we have devised methods of growing it easily in bulk. Once you can grow the bacillus in bulk the way is opened for proceeding to try inoculation methods and the more delicate methods of diagnosis. It is practically hopeless to try methods of inoculation in the case of such a disease unless the bacillus can be grown in bulk.

Another thing which we have found is, that if you take a subculture on agar and make from it another subculture on ordinary media, not containing raw serum, instead of getting the bacillus which Bang described as growing in colonies, you get a bacillus which grows in the ordinary way as single elements. That, as will be seen later, has a considerable bearing on one method of diagnosis, the agglutination test. When the bacilli are grown in media containing raw serum they form into clumps. I will digress for a moment to remind you that bacteria when growing in the body produce certain substances which accumulate and circulate in the blood. One of those substances agglutinates the special bacteria and causes them to form into clumps. If you get a serum from an animal which can cause a special organism to form into clumps, in certain cases you can take it as proof positive that the animal is infected, or has been infected with the disease caused by the organism. Therefore, this can sometimes be made use of as a method of diagnosis. But, as we first grew the bacillus as Bang had grown it, in media containing raw serum, we could make no use of that test, because the organisms in the cultures were already clumped owing partly to the serum which normally has a certain amount of agglutinating power, and owing to the amount of exudate put into the medium to sow it, for the exudate also contains this agglutinating substance. By growing it on other special media devoid of serum and exudate you get simply a cloudy accumulation which consists of single bacteria. If you take some of the clumpless culture, put it into a test tube, and add the serum from certain affected animals—I do not say all, because the stage of infection matters—you will find that instead of a lot of small organisms spread out over the field of a microscopic preparation, you will see the bacteria formed into clumps. You can deduce from this that the animal which provided the agglutinating serum is probably infected with contagious abortion. That is an important matter in the question of diagnosis, because you must remember that although when an animal has aborted, the act can be seen, and one knows what has happened, this is a very chronic disease and an animal may be affected for months and show no outward symptoms whatever. Until the act a farmer cannot know whether the cow is affected or not. If you take the fœtal membranes from an animal that has aborted owing to contagion, and make from the cotyledons a suitably stained microscopic preparation, you will find the organism present in the peculiarly clumped form which enables you to distinguish it from any other of the known bacteria.

We have had a great deal of material from infected farms all over the country in the shape of exudate discharged from the uterus, fœtuses, and the fœtal membranes, and we find that in the membranes the microbes in clumps are practically constantly present. If you find that peculiar, clumped, organism in a discharge from the vagina you may be pretty sure that you are dealing with contagious or epizootic abortion. That, of course, is an important advance in the diagnosis question, for you can make absolutely certain now when a cow aborts whether you are dealing with epizootic abortion or not.

But, of course, that is not the whole question of diagnosis, because the uterus, as I indicated, is a closed book during pregnancy, and if you have an infected herd you wish to know beforehand which animal is going to abort and which is not.

What, then, are you going to do if a man says "I want to know which of my animals are infected and which are not. I have referred already to the agglutination test, but perhaps the most delicate test is the "fixation of the complement." It is a very delicate and complicated test, and one that must remain in the laboratory. Nobody could do it in the field. I am not going into the

whole technique of this test because time will not permit me to do so, but I will again digress for a moment to remind you that if you inject an animal, species A, with the blood of another, species B, the serum of the animal, species A, becomes destructive for the blood corpuscles of the species B. If, say, you inject a cow with goat's blood the cow's serum would become destructive for the goat's corpuscles but not for those of another species. The serum of the injected animal, then, acquires a specific character. Supposing you take a suspension of goat's blood corpuscles and to that you add some of the serum of the cow that has been injected with goat's blood, the goat's corpuscles give up their hæmoglobin to the surrounding fluid and it becomes quite red. That is because the serum has acquired a specific action on the corpuscles of the goat. The process is called hæmolysis, and the serum is said to be hæmolytic. If you take serum from the cow and heat it to 55 C. you will find that it no longer causes destruction of the corpuscles, because the heat has destroyed what is called the complement. The destruction depends on the action of two substances, the complement and the immune body. The immune body is not destroyed at the same temperature as the complement, which is the dissolving substance. The immune body is absolutely specific, and I think "sensitiser" is a better name for it in this relation. Although the immune body or sensitiser is absolutely specific—specific for the corpuscles of the goat in this case, the complement is not specific. The complement is present in the blood of most normal animals. For instance, if you take the hæmolytic cow's serum and heat it to destroy the complement, and add it to the goat's corpuscles, you get no hæmolysis; but if you take the fresh serum of a guinea-pig and add it to the mixture hæmolysis will go on, simply because you have added the complement. If you inject an animal with abortion bacilli you will cause to appear in its system a body (the immune body) which has a great and specific affinity for the abortion bacillus itself. Similarly, if the bacilli are growing in the uterus this substance is also manufactured, and the serum of the affected animal acquires a specific action on the abortion bacilli; it sensitises them to the action of the complement just as the specific hæmolytic serum sensitises the red blood corpuscles. Supposing we take some abortion bacilli in culture and the serum (heated to 55 C.) of a cow that we suspect of being affected with abortion, and we add in proper quantities the serum to the bacilli, we sensitise these bacilli so that they will take up the complement, if the specific sensitiser is present. If afterwards we add guinea-pigs' serum in proper proportion the sensitised bacilli take up the complement from the serum of the guinea pig. If to this mixture we add sensitised red cells we will find, if the proportions are correct, that the corpuscles no longer give up their hæmoglobin, for the simple reason that the complement has been fixed by the abortion bacilli through the medium of the special sensitiser in the serum of the affected animal. If the special sensitiser is not present, the complement will not be fixed and it will act on the sensitised red cells. Therefore, we have a very delicate method of testing whether an animal is infected with the disease or not. Our experiments so far in the laboratory have shown—so far as laboratory experiments can show, that this is a method that one can depend upon.

We have not tried it to the same extent in the field, but we have made a number of observations in the field. Although the laboratory technique is exceedingly complicated, the collection of material in practice for sending it to the laboratory is very simple. If you want to test an animal you simply compress the jugular vein, insert a hypodermic needle, draw 10 c.c. of blood into a syringe and quickly empty it into a sterile bottle, let it clot, and then send it off to the laboratory. It is of great interest to the Committee, of course, to verify this test further in practice and see whether it justifies the hope we formed of it in the laboratory, and for that reason the Committee are prepared to do a certain number of tests on suitable herds, if a veterinary surgeon wishes to go through a herd and try to discover whether this animal or that animal is infected or not. Of course, the Committee cannot make an indefinite number of these tests, but they are prepared to do it in a number of suitable cases.

The agglutination test we have also made use of in practice, and have found it to be helpful. If you take the serum of affected animals and add it to cultures of the bacilli, and put the tubes in an incubator over night (for about fifteen hours) you will find that the serum from the affected animals will agglutinate the bacilli into clumps. Normal serum will do this if added in a high proportion, but the serum of animals affected for some time does it in a greater degree, that is to say, the infected serum contains something in higher proportion than the healthy serum. We have found that at 1 in 10 normal serum will often agglutinate, although the animal is not affected, but never have we found that serum will agglutinate above 1 in 25, unless the animal is infected. This test has its drawback, because we have found that even in certain late stages of the disease—two or three months after infection—the agglutinating power of the serum may not be strong enough to enable one to be certain. We also know that although abortion is a chronic disease, a certain number of animals may abort one or two months after infection, so that by depending upon the agglutination test when examining the animals in an infected byre you might miss some of the affected. The "fixation of the complement" test is a much more delicate method.

The third method of diagnosis will, I think, perhaps interest you more, because it is one that is applicable in the field. Having elaborated methods for growing the bacilli in bulk, we prepared from these cultures a substance of the nature of tuberculin and mallein, and we have provisionally called it abortin. In using this material on cases of known infection we found that infected animals exhibited a rise of temperature. An injection of abortin some times caused a slight rise of temperature in healthy animals, but distinctly smaller than in the affected. Of course, you know the difficulties in the way of interpreting the mallein test and the tuberculin test. It is sometimes very difficult to decide by a difference of 1 degree of temperature that this animal is affected and that one healthy. It would not be right to declare on the trials we have made that this "abortin" is an agent of diagnosis that can be relied upon. We all remember the time it took to convince us regarding the reliability of tuberculin and mallein, but, of course, if there is anything in this "abortin method" it will be a much easier business to convince people, because the general way has been paved by mallein and tuberculin for the acceptance of new substances of the same kind.

I want you clearly to remember that I am speaking mainly from laboratory tests and from a few, perhaps forty or fifty, conducted in the field. I do not want you to carry away the idea that I am convinced that "abortin" is going to solve the question of diagnosis in the field. It is very hopeful, and we are prepared to supply veterinary surgeons with this abortin and instructions as to using it free of all charge, if they are in a position to make useful observations. We have found that a normal animal may react up to 104° F. I would regard a reaction to 104° as suspicious, but I would not say at present that 104° should carry any conviction with it. But, when the reaction goes to 105° or 106° we have never yet found, in the limited number of experiments we have made, that the animal which reacted was not affected or had not aborted. After an animal has aborted you must remember that its system for a time remains in a sensitised state, and it will react for a certain period. If, for instance, in purchasing a newly-calved cow on the

market you have not seen the calf, and the farmer thinks he will not take the cow into the byre until he knows something about it, you can isolate it and probaby tell whether that animal had calved normally or not by applying one of the tests.

Abortin is prepared very much in the same way as tuberculin, and the crude material is diluted before being sent out. The reaction begins about the second hour after injection. I do not think you would miss a very great deal if you waited until the fourth hour before taking the temperature. The reaction goes on to about the twelfth, and the temperature should be taken every two hours.

[Mr. Stockman exhibited typical charts showing the reactions in regard to tested animals].

The next subject I should like to speak about is the question of cure. I observe that the Interim Report we have published has created some rather bitter criticism in certain agricultural journals, because the Committee have been unable to find any justification for what has been called the carbolic acid treatment. These journals for some time past have, in accordance with their limited lights, been strongly advising carbolic acid as a specific preventive and cure, and an almost sentimental regard for this drug seems to have arisen in some journalistic minds. But, if you examine the evidence in favour of carbolic acid with even a little care, you will find that it completely breaks down. We have found that many farmers who have tried carbolic acid have had no good results whatever. We have the testimony of others who merely say fewer of their cows aborted after treatment, but, no one can say that the cows that were treated with carbolic acid were ever infected at all. In one particular experiment we tried carbolic acid on an animal that we knew was infected, and it had no result whatever. We find that in most cases men have resorted to carbolic acid after they have had the disease on their premises for two or three years. A reduction in the number of cases under such circumstances is perfectly explicable. Take almost any herd and let the disease operate for about three years, and you will find that fewer cases occur, although no carbolic acid has been used, either because the animals have become immune and the cases that do occur, occur chiefly in those animals that have been brought into the herd—the new animals—or because the original activity of the virus has spent itself. The number of new or susceptible animals brought in is always in small proportion to the number of old animals, so that a very much smaller number is exposed to infection. You can, therefore, see how a very grave error in connection with the treatment by carbolic acid could arise under such circumstances, for the way is opened for a *post hoc ergo propter hoc* conclusion, which can only be accepted after the most careful analysis of the evidence. On account of the dogmatic assertions which have been made regarding the specific effect of carbolic acid in practice and the absence of admissible evidence in support of them I have been at the trouble of examining some of the theories that have been advanced to explain its action. It has been said that you can saturate the system with carbolic acid so as to render it impossible for the microbe of abortion to live in the body. That is nonsense. One could not saturate the system with carbolic acid without killing the animal. A comparatively very small amount, in the antiseptic sense, of carbolic acid would be sufficient to kill the animal. Some advocates of the treatment, again, appear to have fallen into confusion of medical thought in their search for a theoretical explanation. They say that there are substances which evidently have a specific antiseptic influence on certain microbes, and that is true, although it would be more correct to use the word destructive in place of antiseptic. We have Iodide of potassium in actinomycosis, mercury in syphilis, quinine in malaria. But, those who have made use of these spurious analogies must think that the action of these specific drugs is due to saturation of the body. If for the successful treatment of syphilis you had to saturate the body with mercury in an antiseptic proportion you would kill your patient. These specific drugs seem to act almost as specifically as the antitoxic sera. In reality you administer, comparatively speaking, quite a small quantity, but the organism that you attack having an affinity for the drug that small quantity becomes concentrated on the microbe or parasite. That is quite a different thing from injecting a substance like carbolic acid which no one has ever maintained to possess an affinity for any microbe or parasite. When it acts as an antiseptic it does so merely because it is present in certain proportions.

Now as regards carbolic acid and other purely antiseptic substances as preventives when administered by the mouth, clearly, if you want to disinfect virus which may be swallowed at any moment, you will have to keep the amount of the disinfectant in the stomach and intestines in antiseptic proportions, 3-4 %, to make certain of destroying all the virus that may be swallowed. It is absurd to think that you could keep an animals' intestines permeated with disinfectants so that they can swallow infected material with impunity. It is admittedly impossible to disinfect the stomach of even a simple stomached animal, and it should not require much mental effort to understand how much more difficult it would be to disinfect the enormous stomachs of a ruminant.

We have tried curative experiments on the newer lines of injecting the animals with specific bacterial products. We have used the dead bacteria of abortion in our experiments with a fair amount of success; but in spite of that I have no very great hope that anything very practical will come out of curative measures, because the animals will often be far advanced in the disease before one knows that treatment is called for. I do not think any bacteriological treatment with dead bacilli could be expected to do anything more than effect a small proportion of cures. If you get the cases early the thing is hopeful.

Now as regards the question of preventive inoculation, that, I think, is the most hopeful method at present of attacking epizootic abortion. It is not a disease we can slaughter out for and give compensation: it is not a disease that we shall have any particular success in curing. But, I think it is a typical disease for prevention by inoculation if a good method is to hand. We find that, although the abortion bacilli in small quantities when inoculated into a pregnant animal will cause abortion, you can give an enormous dose under the skin to a non-pregnant animal without doing the animal any harm. One of the great objections to methods of inoculation is that you have to go backwards and forwards so often to repeat the dose that a client generally objects to the expense. But, we have here a method by which you can at one time put into the animal a sufficient quantity of material without doing it any harm, and apparently produce immunity—I say apparently because it has yet to be tried in the field. We immunised the animals we experimented with, and afterwards tested them with enormous doses of virus—doses they could never under any circumstances take in in practice, and yet they resisted infection. We are now carrying on immunisation experiments in the field. I do not believe that a man is justified in dogmatising merely from what happens in the laboratory. One certainly must do one's first experiments in the laboratory to see whether a method is worth anything, but the value of a method of preventive inoculation can only be obtained in the field. One thing to remember about this inoculation is that you cannot inoculate a pregnant animal, because you would infect it. You must inject the animals you are going to attempt to immunise about

six weeks or two months before they are put to the bull. By the end of six weeks or two months the system is cleared of all the bacilli inoculated, and our hope is that in a very large percentage of the cases the animals will be immune. You know, of course, that a large proportion of the animals that have aborted once acquire immunity, and this is simply an artificial method of immunising beforehand. The dose of the material is pretty large. At one injection you give them 150 cc. As a matter of fact you can easily put a litre or more of the material under a heifer's skin without doing it any harm. In the majority of cases there is no particular swelling; there is no lameness, the animal does not seem to be up or down over it. The material is absorbed and no ill effects follow. The material is grown in flasks, and is bottled up for transit under absolutely aseptic conditions.

(Mr. Stockman demonstrated the methods of bottling the material aseptically and exhibited a metal syringe of 150 cc. capacity adapted for hypodermic injections in the field.)

We are prepared to give out a certain amount of material for trial without any charge to veterinary surgeons who can make arrangements to test it properly, and keep notes of their observations. I do not think it is wise that it should be put into any but professional hands, because it is a living virus and a man might infect a place with it, and in that sense it is highly dangerous. It is not dangerous to man like anthrax, but we are not prepared to say that it is not dangerous to woman. In conclusion, I will read you the memo. we have prepared with regard to making observations on herds affected with the disease :—

MEMO ON PLANS OF OBSERVATIONS TO BE MADE ON HERDS AFFECTED WITH ABORTION.

(1) Submit all the pregnant animals to what has provisionally been called the "Abortin test."

It is advisable to include in the test animals which have recently aborted whether they have since become pregnant or not. They to some extent act as control animals in the test, since it has been found that those which have aborted recently react with a considerable amount of certainty.

(2) Separate the reactors from the non-reactors if possible.

Where the two can be separated from each other a more valuable observation in some cases can be carried on, but, of course, it is recognised that this will not always be possible. Even if this is impossible very useful observations can be made. It may be mentioned that if a separation can be carried out, the better plan is to remove the healthy and leave what are considered to be affected in the infected sheds.

(3) Treat with material, which has provisionally been called "abortion cure," one half of the reactors and leave the other half untreated for comparison.

(4) Immunise by inoculation one half of the new animals coming into the byres and one half of the older inmates which are not pregnant with material which we have provisionally called "anti-abortion." The non-pregnant cows which have recently aborted should also receive "Anti-abortion" as one cannot be sure whether or not they have acquired immunity from their attack of the disease.

(5) If the healthy cannot be separated from the suspected there is no reason why the test, the treatment, and the immunisation should not be carried out. For testing the immunity conferred by inoculation it will be even a better test if separation has not been effected, as in such cases the inoculated animals will presumably be exposed to greater risks of infection.

(6) It is essential that all the pregnant animals in the infected byre be submitted to the "Abortin test." But for gaining information on the value of immunisation and treatment it will be much better if only half the suspected be put under curative treatment and half the non-pregnant be immunised, so that a comparison of results can be made. Still, if this cannot be arranged, a good though less valuable observation can be made by treating all the suspected and immunising all the non-pregnant, and comparing the number of abortions with those in former years.

(7) Send to the laboratory : (*a*) the name and address of owner, (*b*) the date when abortion began, (*c*) if possible the approximate number of abortions in the last twelve months, (*d*) the total number of cows and heifers, (*e*) the plan which is to be followed (see 6), (*f*) number to tested, (*g*) number to be immunised, (*h*) after test the number to be treated, if any, (see Form A.)

(8) All the animals to be put under observation should receive a number or distinguishing mark to facilitate future reference.

(9) Keep note, and forward returns as set forth in Forms A. B. C. and D.

(10) The "Abortin test" is performed by injecting the material subcutaneously at the shoulder. The operation must be performed with all antiseptic precautions, and "abortin" can only be supplied to veterinary surgeons. The temperature should be taken and recorded before injection and every two hours beginning at the fourth hour after injection and ending at the twelfth, but if the temperature rises above 105 before the twelfth hour, further taking of the temperature will not be absolutely necessary. As it seems possible that in the earlier stages of infection a reaction may not be obtained, it will be advisable to re-test the non-reactors a month after the first test.

(11) The injection with "anti-abortion" (dose 150 c.c.) is to be performed with strict antiseptic precautions, and the material, which is itself infective, can only be supplied to veterinary surgeons. It must be noted that "anti-abortion" consists of virulent cultures of the abortion bacillus. It should not be used on clean premises, and should be employed with all the necessary care even on infected establishments. No dregs from bottles or syringes should be poured out except into a receptacle which can be disinfected. The material is harmless to non-pregnant animals when injected into the loose subcutaneous tissues, but on no account should it be injected to pregnant animals. A non-pregnant animal should not be put to the bull for six weeks to two months after inoculation : otherwise the immunising material may cause infection. For the immunising operations a specially large syringe is required on account of the dose. A limited number of these can be lent from the laboratory, and can be sent with instructions *re* sterilising, or they can be purchased from the makers at a cost of about 7s.

(12) "Abortion cure" is to be injected into the loose subcutaneous tissue and the part is to be gently massaged for 5-10 minutes to promote absorption. Two injections are given with an interval of a month. The material consists of dead cultures evaporated to reduce the bulk. The material is harmless to pregnant and non-pregnant animals when injected subcutaneously. It is very unlikely that it will prove useful on animals past the fifth month of pregnancy. As its preparation requires much time only a limited amount can be supplied, therefore it should not be used except on suitable animals. It is possible that it might prove useful for endowing already pregnant animals with a certain degree of immunity, and proposals to try it in this way in infected byres will be considered.

The Forms can be obtained from this laboratory. There is no particular trouble in keeping the records, because we have prepared forms which have only to be filled in and returned to us.

These, gentlemen, are the principal points I wanted to bring to your notice at this period of the investigation.

DISCUSSION.

The CHAIRMAN said the disease was a very distressing one to country practitioners, especially where there were pedigree herds with valuable calves. He thought the abortin test was so highly technical that it could be hardly undertaken by the ordinary country practitioner.

Mr. STOCKMAN said surely not difficult.

The CHAIRMAN thought the prospect of immunisation was very comfortable, and a step towards stamping the disease out.

Mr. STOCKMAN said the technique of the test was about the same as in the tuberculin test, and the interpretation was similar. There was nothing difficult at all in performing the abortin test.

The CHAIRMAN asked whether, in testing a herd in which 20 per cent. of the cows reacted, it would indicate that they were infected, and what should be done to isolate the infected animals.

Mr. STOCKMAN said he should, when possible, remove the sound ones and leave the affected in the infected byre, but this would often be difficult because in most cases the greater number would not be infected at the date of one test. The virus remained active for a long time. He had in the laboratory exudates that had been out of the body of an infected cow for seven months or more and he was practically certain that if he injected them into pregnant cows now they would cause them to abort. Therefore, in a stable containing virulent material of that character the disinfection that could be carried out on a farm was not very reliable, especially in a byre full of nooks and crannies. There seemed to be no other way than inoculation to deal with a disease caused by such a persistent virus.

Mr. BROAD asked how long the disease had existed in the country, whether it was spreading, and also what was the chief mode of infection.

Mr. STOCKMAN thought the common method of infection was by the mouth. If virulent material was poured over the throat of a pregnant cow she would be almost certainly infected. A considerable proportion of the experiments made by injecting virulent material into the vagina had failed although the virus had been put in with a tube right up to the os uteri. The bull played a secondary *rôle* altogether in the dissemination of the contagion. Most of the evidence on which the bull theory was founded disappeared with the discovery that an animal could be infected very easily by the mouth, and he thought there was no doubt that the infection was usually taken in with the food or water. With regard to the time the disease had been in the country, it had no doubt been prevalent for a very long time, but many people had kept very quiet about it. All information obtained by the Committee had been got under a strict agreement of secrecy; men refused even to tell their neighbours that they had the disease in their animals. Now that attempts were being made to do something quite a number of men came forward and admitted the disease was present in their herds, but how prevalent it was would never be known until there was an Order for notification. Agriculturists themselves seemed to think that an Order of some kind was necessary. The Committee had never met with epizootic abortion from any other cause than contagion, and they had obtained actual proof of the existence of the disease in at least 36 counties in Great Britain.

Mr. MALE (Reading) asked whether Mr. Stockman had made any investigations as to how long the bacillus could live in the open air. He had been glad to hear what was said about carbolic acid, but was bound to say that in every case he had used it it had been apparently successful, though possibly the other measures taken at the same time might be responsible for the disappearance. Yet in some cases no other measures had been used at the beginning of an outbreak except carbolic acid, and the disease had been stopped. He wondered whether carbolic acid taken with the food twice a day might have some action on the bacillus. He thanked Mr. Stockman for his important work.

Mr. STOCKMAN said he did not wish the impression to go abroad that the investigation was his own. Although most of the work had been done in the Laboratory by himself and his assistants, it really was the work of the Committee. The appendix containing all the details on which the report was based was prepared by Sir John M'Fadyean and himself working for the Committee. With regard to how long the bacillus remained active outside the body, it was known that the disease remained about a place for two or three years and longer, that it would stop for a few months and then begin again in the new animals brought in. The virus could remain active for months outside the body. He did not think, however, it remained active for long in the body of a non-pregnant animal. If an animal aborted twice he did not believe it was owing to the persistence of the bacilli inside the uterus. Probably in from one to two months all the bacilli were destroyed in the system of non-pregnant animals, but the animal was often exposed to re-infection, as it did not always become immunised after an attack of the disease. With regard to carbolic acid, he would reply by asking whether anyone knew of any actually infected animal treated with carbolic acid recovering, and whether anyone had ever treated one half of the new animals in an infected byre and compared the results with those in the other half which was not treated. No man could point to such an observation, and yet it was the only evidence upon which an assertion could fairly be based. If the test turned out to be a reliable method for diagnosis an opportunity would be afforded for trying carbolic acid under rational conditions, and he thought when that opportunity was furnished carbolic acid would cease to be used. He did not think there was one sound argument on which to base the contention that a small amount of carbolic acid administered once or twice a day was sufficient to kill any virus an animal might swallow, seeing that every moment of the day she might take that virus into her body. Still less was there any sound argument to support the belief that pounds of exudate containing millions of bacilli in the uterus could be disinfected by giving a small amount of carbolic acid by the mouth.

Mr. BROAD asked whether cows frequently became barren after slipping.

Mr. STOCKMAN replied, with reserve, in the affirmative. There was no doubt that for a certain period after abortion animals did not become pregnant, they did not hold to the bull, missing perhaps two or three times, but most of them eventually became pregnant. He did not think the abortion bacillus had directly much to do with this failure. He thought it was that the uterus having been in a very catarrhal state owing to the disease, it took a long time for the mucous membrane properly to regenerate itself. It was generally thought that if the mucous membrane of the uterus was unhealthy, a female was very unlikely to become pregnant, and he thought that accounted for failure in many cases. That, however, raised another point of great importance. There was a good deal of sterility in this country amongst cows, and it was often found amongst cows that never had aborted. This he thought was due to contagious vaginitis, which was a much more prevalent thing than was supposed. It was said in Switzerland and other parts of the Continent that vaginitis was responsible for abortion, but he did not believe that. He believed that abortion and vaginitis occurring together had led to the mistaken belief that vaginitis was

responsible for abortion. He thought there was more vaginitis in the country than was thought, and that this disease was probably the cause of the sterility, which apparently was on the increase amongst cattle.

The CHAIRMAN said he had seen a good deal of carbolic acid treatment, and where it was used the disease had gradually died down in about two years, but he ascribed that to the cows becoming naturally immune. He had known cows abort that had had carbolic acid for six months. In the present year he had been troubled with a good deal of sterility in cows, and it was very probable he had overlooked the symptoms of vaginitis.

Mr. STOCKMAN continued: There were two forms of vaginitis, a form exceedingly like gonorrhea. He had found that the gonorrheal form of the disease had been spread in some cases by testing the cows with tuberculin, and taking temperatures with the same thermometer, Mr.—— had had an outbreak near the laboratory, and by request had sent a cotton wool swab infected by pushing it into the vagina. This was put into the vagina of a cow at the laboratory, and she developed the disease. She was given injections of corrosive sublimate and was apparently cured, but about six months afterwards, when taking her temperature for another purpose and using the same thermometer he infected every one of six heifers he was at that time immunising against redwater. He believed that the other form of vaginitis, the granulation form, was equally persistent. He had a specimen of the latter disease from some cows of Mr. Simpson's showing hard granules like little vesicles, which was the form of the disease described on the Continent.

Mr. P. J. SIMPSON said he was called to see a cow eight days after she had been to the bull, and she was noticed to be restless, frequently urinating and generally showing irritability in the hind quarters. There was another cow which was sent to the same bull about three or four days after the first one, and she also started showing the symptoms. He diagnosed the case. A neighbouring practitioner certified the bull as being perfectly free, and he was at a loss to explain the matter. The granules could be seen just inside. He consulted Mr. Stockman and it was decided to have the animals killed. The specimens were sent up to Mr. Stockman.

Mr. STOCKMAN, continuing, said he inoculated an animal with a swab taken from the specimens and the inoculated animal took the disease. The lesions appeared over a very small area and a cure was effected. He did not deny that it was possible for a bull to spread abortion. If a bull served a cow with an infective discharge and immediately afterwards served another cow there would be at once a reason for the infection, but the actual conditions for infection by the bull did not often arise. The evidence, however, was all in favour of the bull being the true disseminator of vaginitis.

Mr. P. J. SIMPSON said the bull had served three or four other cows between serving the first and second, and it was said those cows were quite free from any trouble.

Mr. STOCKMAN, continuing, said it was probably possible to have the disease in a mild form, and he had never seen a description which corresponded to the intensity of the symptoms and lesions in the animals referred to by Mr. Simpson; he thought that possibly the mild cases were overlooked, but remained infective.

Mr. MALE said he had a similar outbreak in which several cows were affected, their temperature going up to 105 and 106 and the animals exhibiting a good deal of pain and irritability. The mucous membrane was very red, with a certain amount of granulations. He used zinc sulphate and permanganate of potash injected into the vagina and had good results.

Mr. EAST asked whether there was any difficulty in injecting the quantity of abortin suggested.

Mr. STOCKMAN said 5 or 10 c.c. of abortin was used and there was no difficulty. Nor was there any difficulty in injecting an animal with very large quantities of fluid, quantities of 400 or 500 c.c. could easily be injected under the skin.

Mr. P. J. SIMPSON asked how long the inoculation should be continued with fresh incomers into the herd.

Mr. STOCKMAN said until the last case had disappeared.

Mr. P. J. SIMPSON said supposing there had been no case of abortion during a season would that be a sign that one could cease inoculating.

Mr. STOCKMAN said it was difficult to say. It was impossible to say a herd was free until the last animal had calved normally, and fresh animals coming in might carry the precedure over two or three years. The question would have to be answered in practice if inoculation turned out a success.

Mr. SIMPSON pointed out that in the case of inoculation for prevention in an animal that had aborted it would be necessary to lose two or three services.

Mr. STOCKMAN said it would be necessary to lose two or three months, but that was lost in any case according to his information. He thought from experiments made that in about six weeks all the virulent material was out of the cow's system.

On the proposition of Mr. Roberts, seconded by Mr. Lepper, a very hearty vote of thanks was accorded to Mr. Stockman for his able and helpful dissertation.

Mr. ROBERTS mentioned an outbreak in Westmorland and Cumberland thirty years ago when every sort of quackery was tried, even to the extent of dragging the animals through smoke or burying one of the aborted calves in the doorway through which the cattle had to come. He rejoiced to know that scientific experiment was leading to something more hopeful than the treatment in the old days, and expressed the wish that such an important discovery would not be put into the hands of any but veterinary surgeons.

Mr. LEPPER, in seconding the motion, said he knew of one or two farms where Nocard's treatment had been applied with more or less success. Whether the treatment had been successful, or the success had arisen from the animals becoming immunised by length of time he did not know.

A vote of thanks to the Chairman concluded the meeting.

Government Veterinary Staff at the Cape.

The following is the list of the Veterinary Officers serving on the Technical Staff, at Dec., 1908:—

Chief Veterinary Surgeon: J. D. Borthwick, F.R.C.V.S.

Sixteen Assistant Veterinary Surgeons distributed as follows:

R. W. Dixon, M.R.C.V.S., Cape Town.
M. A. Hutchence, M.R.C.V.S., Kokstad.
G. W. Freer, M.R.C.V.S., Uitenhage.
J. Spruell, F.R.C.V.S., Somerset East.
J. A. Robinson, M.R.C.V.S., King William's Town.
A. Goodall, M.R.C.V.S., Worcester.
C. Goundry, M.R.C.V.S., Aliwal North.
J. H. Lyons, M.R.C.V.S., Grahamstown.
W. G. Pakeman, M.R.C.V.S., Queenstown.
S. Elley, M.R.C.V.S., Oudtshoorn.
R. Paine, F.R.C.V.S., Elsenburg, Mulder's Vlei.
P. X. Kearney, M.R.C.V.S., Umtata.
W. Simpson, M.R.C.V.S., Vryburg.
W. Jowett, F.R.C.V.S., D.V.H., Cape Town.
J. A. Worsley, M.R.C.V.S., Butterworth.
C. S. Elphick, M.R.C.V.S., Cape Town.

DISEASES OF ANIMALS ACTS 1894 TO 1903, SUMMARY OF RETURNS.

Period.	Anthrax.		Foot-and-Mouth Disease.		Glanders (including Farcy)		Parasitic Mange	Sheep Scab.	Swine Fever.	
	Out-breaks	Ani-mals.	Out-breaks	Ani-mals.	Out-breaks	Ani-mals.	Outbreaks.	Out-breaks	Out-breaks.	Slaugh. tered *
GT. BRITAIN. Week ended Aug. 14	27	31			11	27		1	28	161
Corresponding week in 1908 ...	17	25			15	52		...	32	207
Corresponding week in 1907 ...	17	20			22	32		1	56	358
Corresponding week in 1906 ...	11	12			27	48		1	14	155
Total for 33 weeks, 1909	873	1159			366	1340		465	1197	10564
Corresponding period in 1908 ...	726	977	3	112	528	1684		636	1429	7871
Corresponding period in 1907 ...	719	950			601	1376		409	1726	8164
Corresponding period in 1906 ...	594	876			714	1348		298	755	4255
Board of Agriculture and Fisheries, Aug. 17, 1909.										
IRELAND. Week ended Aug. 7	2	2	...	...	...	...	1	...	3	1
Corresponding Week in 1908 ...	...	...	...	...	...	...	3	1	1	14
Corresponding Week in 1907 ...	...	...	...	...	...	...	...	1	4	137
Corresponding Week in 1906 ...	...	...	...	...	...	1	1	3	1	19
Total for 32 weeks, 1909	5	5	...	...	...	...	63	313	78	1321
Corresponding period in 1908 ...	5	8	...	...	...	...	29	272	127	2711
Corresponding period in 1907 ...	1	3	...	...	4	8	57	188	90	1477
Corresponding period in 1906 ...	3	7	...	...	5	13	65	228	111	1058

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Aug. 11, 1909.

NOTE.—The figures for the Current Year are approximate only. * As Diseased or Exposed to Infection

THE FUNCTIONS OF THE PERITONEUM AND THEIR BEARING UPON INTESTINAL SURGERY.

The address in Surgery at the recent gathering of the British Medical Association at Belfast was delivered by Mr. A. E. Barker, F.R.C.S., of London, who devoted the major portion of his discourse to a review of the progress which has been made in intestinal surgery during the last twenty-five years. Many surgeons now living can remember the time when any transperitoneal interference with the intestinal canal was regarded as one of the most dangerous of surgical undertakings. Enormous advances have been made since then, and, in Mr. Barker's words "what has so far been achieved is almost as nothing to what remains to be done." One of the chief reasons for this great and ever-increasing progress is our improved conceptions of the functions of the peritoneum.

The first surgeons who ventured to attack the intestines did so under the impression that the peritoneum was one of the most vulnerable tissues in the body, but soon afterwards it was gradually recognised that this membrane possessed wonderful powers of repair. Some workers saw this even before the antiseptic era—notably Spencer Wells, much of whose work was done before the acceptance of the Listerian *régime*. But when Listerian principles were fully understood and accepted, the natural tendency at first was to attribute successes in abdominal surgery wholly to the antiseptics employed and the cleanliness observed; and the reparative powers of the peritoneum were forgotten for a time.

Before long, however, surgeons recognised that in many of the cases of abdominal section which had recovered before the antiseptic era, the operation could not possibly have been performed under conditions even approaching ideal asepsis. Some infective material must have been left in the abdomen after operations which, in many cases, had been followed by recovery. The recognition of this truth again directed attention to the reparative powers of the peritoneum, at a time when the increased frequence of abdominal sections afforded ample opportunities for clinical observations. Appendicitis, for instance, began at this time to be better understood, and its clinical history to be more closely followed with or without operation; and it soon became clear that unless the peritoneum possessed the power of coping with and disposing of very considerable quantities of septic matter no case of *acute* appendicitis could possibly recover. On the other hand, it was certain that many such cases did recover without any operation, even after severe peritonitis. The natural deduction was that the peritoneum was the active ally of the surgeon; and this, while it led to much greater hopefulness about all surgical interference within the abdomen, also raised a doubt as to whether the free use of germicides in abdominal surgery was really beneficial, or indeed not better avoided, on account of the risk of the germicides damaging the reparative properties of the peritoneum.

In more recent times, bacteriology and biology have considerably aided the surgeon to an understanding of the defensive functions of the peritoneum and other serous cavities. The old observation of the ability of the peritoneum under proper stimuli to rapidly throw out a certain amount of plastic lymph for the repair of a lesion or the shutting off of an infected area has been confirmed, but the defensive capacity of the membrane does not end with this. It is now known that under traumatic or bacterial irritation the peritoneum pours out an abundant effusion of fluid which, in the first place, dilutes any toxins present, and, in addition, resembles healthy serum in possessing an inherent property of inhibiting or destroying bacterial growth to a

certain extent. Of course this power is not unlimited, but it is none the less marvellous as far as it goes, and it becomes more fully appreciated by surgeons every year.

This view of the defensive properties of the fluid thrown out by the peritoneum is a recent one, and its development has gone hand in hand with the study of phagocytosis and cytolysis, and of antibodies and opsonins in the blood and fresh serum.

It seems certain now that, up to a certain point, inflammatory effusions into the peritoneal cavity under septic irritation are beneficial; and this explains why much better results are now very often obtained in abdominal surgery without drainage in cases in which, a few years ago, drainage was considered indispensable and carried out very elaborately. "We have learnt" says Mr. Barker "to be more rigorous in our precautions for warding off sepsis from without during operation, more careful to guard the serous surfaces from all rough treatment during manipulation, and from chemical or physical irritation while exposed, and, on the other hand, more hopeful and bolder in cases where it is already obviously present within the abdomen."

Three cases cited by Mr. Barker from his own practice, illustrate the influence of the new conceptions of the functions of the peritoneum upon modern surgery. One was of a fourteen-year-old boy, operated upon about a year ago. The patient had been ill for some weeks with peritonitis, which had culminated in an abscess, probably of tuberculous origin, in the left iliac fossa. Upon section, a collection of fœtid pus was found in the midst of adherent coils of small intestine, so rotten that the bowel wall gave way when separation of the adhesions was attempted. Resection of a considerable length of small intestine, and end-to-end anastomosis of sound bowel was necessary. This was done without antiseptics in the presence of foul pus, some of which must have been left behind in the abdomen after the operation. Nevertheless, Mr. Barker thought it best to close the abdominal wound without drainage; and though pus oozed out between the stitches for some days it soon ceased, and the boy made a complete recovery.

The other two cases were curiously alike, except as regards the age of the patients. Both were women, one aged 49 and the other 76. Both were operated upon when in a very serious condition from strangulation of the intestine by a constricting band. In both the abdominal cavity was found upon section to contain a large quantity (two pints in the older woman, 1½ pints in the younger) of foul greenish-brown fluid, and a considerable portion of intestine was hopelessly gangrenous. Resection and anastomosis were practised, 5½ feet of intestine had to be resected in the older patient, and 4¾ feet in the younger. In both cases the abdominal wound was completely closed without drainage and without the use of antiseptics, and in both the recovery was perfect and permanent, though in neither could there be any pretence that the abdomen was left aseptic at the close of the operation. The peritoneum was manifestly able to deal with what septic matter remained after the removal of the gangrenous intestine and the bulk of the effused fluid.

Mr. Barker remarks that without a belief in the newer views as to the powers of the tissues to deal with considerable quantities of certain septic matters he would have regarded these three cases as hopeless and abandoned them when he saw the state of things within the abdomen.

Moreover, he is convinced that any prolonged attempts to render the abdominal cavity more ideally clean either by flushing with antiseptics or by sponging out—such as would have been made a few years ago—would have been not only futile, but injurious to the defensive works of the peritoneum. He summarises the procedure in all three cases thus. "It was our business to restore the continuity of the obstructed and damaged bowel, and by every conceivable precaution of asepsis to prevent any superadded infection from without. This we did, and evacuated the bulk of the foul matter. With what remained the peritoneum was able to deal, and did so rapidly."

As the protective functions of the peritoneum are becoming fully appreciated, the limitations of those functions are also becoming more clearly understood. Experiments upon animals and observations upon human patients have shown that various influences, such as prolonged exposure and chill, or injudicious manipulation or sponging, quite apart from sepsis, lower the reparative forces of the peritoneum. Again, though the peritoneum can cope with a certain amount of bacterial poison, its capacity in this respect is not unlimited and may be overcome by a sufficiently numerous invasion of even the less virulent micro-organisms.

It is also known that there are various infections—for instance, with certain streptococci—which seem almost from the first to baffle all the protective powers of the serous membranes. The peritonitis of appendicitis, which often demonstrates the protective functions of the peritoneum, also provides many illustrations of the incapacity of the peritoneum to deal with certain infections.

Some cases of appendicitis recover without any operation, and some, when operated upon, reveal reparative processes so far advanced as to leave no doubt that recovery would have taken place without surgical intervention. But there are other cases in which toxæmic symptoms appear early; but when the abdomen is opened, only general redness of the serous surfaces, with very slight effusion and no trace of reparative lymph, is found, although deep general toxæmia is already obviously present. In these latter cases the peritoneum from the first seems unable to cope with the poison, either on account of its quantity or more probably, of its peculiarly noxious quality. Many cases of punctured wounds of the intestines follow a similar course.

It is now fully recognised that the term "peritonitis" includes conditions as widely apart as are an ordinary attack of eczema and a desperate cutaneous streptococcal erysipelas.

Another observation of the greatest importance is that healthy intestinal walls will prevent the migration, to any serious extent, of the bacteria of the contents through them, but that if their vitality is lowered by accident or disease, even without any breach of surface, this bacterial migration will take place through mucous, muscular, and serous coats, and the peritoneal cavity become more or less seriously infected. This discovery was first made upon the fluid found in the sacs of heaniæ in various degrees of strangulation, and has greatly influenced surgeons. It warns them to be as gentle as possible in manipulating the bowel, and to be sure, when resecting any portion, that only really healthy tissue (not merely that which shows no loss of substance, but such as is capable of resisting bacterial migration from within outwards) is left behind. It also indicates the necessity of attempting to reduce the number of bacteria in the alimentary canal before commencing enterectomy, if time will permit. Laxatives, enemas, intestinal antiseptics, cleansing of the mouth, teeth, and pharynx, and the use of only sterilised albuminous food, are all valuable measures whenever feasible. In cases of obstruction, thorough washing out of the stomach, which often contains large amounts of putrid food, is a routine procedure whenever it is possible for the same reason.

Many other recent additions to surgical knowledge have combined to reduce the risks of intestinal operations. One is the discovery that, contrary to the older views, the patients need not necessarily be deprived of

food by the mouth for long periods after such operations.

It is now known that the mechanical efficiency of the deeper line of sutures passing through all the intestinal coats generally endures for days if cleanly done and prevents separation from peristalsis, that enough lymph is thrown out in six or eight hours round the outer sero-muscular sutures to produce fairly sound union and stop leakage, and that the better the patient is nourished the more perfect this plastic process will be.

When vomiting remains after the anæsthetic, peptonized rectal injections are available, and a more recent and extremely valuable addition to our resources is the subcutaneous administration of several important aliments. Water, the first need of the system, can be given in the form of normal saline solution in large amounts and with perfect safety. Carbo-hydrates can also be administered in this way in the form of a 5% solution of glucose; and thus two ounces of sugar, a very important food, can be given per diem without any demand on the alimentary tract. This free administration of fluids causes increased action of the kidneys, which is probably extremely useful by diluting and carrying from the system toxic material arising from the condition for which the operation was performed.

These and other recent additions to the theory and practice of surgery have had great effects upon its results. One of the most notable of these is the extent to which it has been found possible, in patients of all ages, to remove considerable lengths of the jejunum, ileum, colon, and rectum without any very apparent influence for evil upon the digestion and assimilation. To how great an extent this can be carried is still uncertain, and the ulterior effects of removing large portions of intestine are still under investigation. But it seems fully established that the removal of any amount of small intestine up to six feet can be well tolerated; and though it is less certain how much of the large intestine can be removed without perceptible effects on the health, yet in some cases nearly the whole has been taken away, or excluded from use, and the patients have enjoyed good health afterwards. The consequent improvements in the results of operations for cancer of the bowel, so hopeless until quite recently, are perhaps the most striking achievements of intestinal surgery. Cancers of every part of the large intestine from the cæcum to the anus can be removed with immediate success, and as much if not more prospect of non-recurrence as those of other parts, while the terribly objectionable artificial anus is constantly becoming more rare.

Finally, Mr. Barker points out that the evolution of intestinal surgery has not been due altogether to either the better conception of asepsis or improved manipulative skill. It has resulted from clearer views on the vital processes concerned in all lesions within the abdomen; and these have been gained partly from closer clinical observation, partly by the aid of anatomists, pathologists, bacteriologists, biologists, and physicists, and by careful sifting of experiences, whether of failure or success. And, despite the enormous difficulties surrounding this important field of surgery, what has been done in it within the last few years assures us of a far greater yield in years to come, working as we shall do under more favourable conditions and with ever-increasing knowledge.—*British Medical Journal.*

Paraffinum liquidum, *B.P.*, now commonly known as "liquid vaseline" is an excellent catheter lubricant, and has been employed for the purpose for at least fourteen years. It is neutral in reaction, without taste or smell, is not easily decomposed by heat, and boils at about 680 F. It is not a germicide, but is an undoubted inhibitor of microbic activity. It can be sterilised either by boiling in a vessel, or on the surface of water, without any danger whatever.—*B. M. J.*

Disinfectants.

Medical science in many ways tries to combat those unseen foes the ubiquitous bacilli, but whatever other means of prophylaxis be adopted, the need for efficient chemical disinfection will always remain. And it is very necessary that the efficiency of any disinfectant offered to the public should be known and expressed in clear terms. For years ceaseless efforts have been made to find suitable means of testing and expressing this efficiency. Modern research shows that many diseases are due to the presence of some micro-organism, and therefore the scientific conception of a disinfectant is one that can kill the organism outright, and any agent that cannot thus kill the organism is not a true disinfectant.

It is, of course, essential that under many existing conditions disinfectants should be used, and especially at a time like the present, when not only do people live often in overcrowded and insanitary conditions, but animals have to travel under circumstances unknown to earlier generations, namely, in cattle trains and by steamboats, both of which should be thoroughly disinfected after each journey, and before other animals are put into the same conveyance.

For agricultural purposes, the selection of the disinfectant requires care. Take, for example, cattle trucks or horse boxes. It map be that a horse suffering from glanders in the incipient stage is moved one day, and a valuable, healthy horse may be in the same box a day or two afterwards; and in the case of cattle trucks, an animal suffering from bovine tuberculosis may be carried, and the next day some healthy beasts might be put in the same truck and contract the dieease. Therefore it is most essential that whatever is used to purify these boxes or trucks after any diseased animals have been in them should be a disinfectant in the true sense of the word, and should be sufficiently powerful to destroy the bacilli of these diseases.

In a lecture delivered at the London Tropical School of Medicine, Dr. S. Rideal referred to the experiments of Nadsden and Nyman, and of Miss Chick, showing that the velocity of the disinfection depended primarily upon the number of bacteria to be disinfected, and secondarily on their resistance or age. Miss Chick also confirmed the fact that temperature influences the process of disinfection, the practical result of this being that disinfection is more rapid and complete in warm climates than in England, and in warm weather than in cold.

The choice of the disinfectant must vary with different organisms and under different conditions. Anthrax spores are capable of far greater resisting power than the bacillus of tuberculosis; but in order to destroy the life of the organism the disinfectant chosen must be a real disinfectant It is necessary to have some standard of efficiency, and because of its general use and the ease with which it can be standardised, carbolic acid has been chosen, and most of the principal disinfectants are now reported on in terms which show their relative strength or effectiveness under similar conditions to a standard solution of carbolic acid. The process employed is known as the Rideal-Walker method, and the strength of the disinfectant is expressed as the co-efficient of carbolic. In this way the actual strength of the disinfectant is known. For instance, taking carbolic acid as the standard, it is found that the action of perchloride of mercury (the conditions of the test being in each case the same) against the typhoid bacillus is twenty times greater than that of carbolic acid. So that the carbolic co-efficient of perchloride of mercury is 20. In this way the co-efficient of any disinfectant can be given and their effectiveness in destroying micro-organic life can be compared.

Sir,—It is a curious fact that one of the chief obstacles to the use of efficient disinfectants for agricultural purposes is to be found in the action of the Board of Agriculture itself. In the various orders of the Board, under the Diseases of Animals Acts, frequent reference is made to the need for disinfection in certain stated circumstances. This, of course, is valuable so far as it goes. But, unfortunately, the advice is robbed of much of its value through the fact that the method of disinfection is usually left to the discrimination of the person called upon to carry it into effect. It might be argued that anyone entrusted with work of this nature might not unreasonably be expected to be competent to select a suitable germicide for this purpose. The fact remains, however, that many widely advertised and largely used disinfectants possess very little germicidal action in general, and none at all in certain circumstances. And this applies with equal force to certain preparations which are not proprietary articles at all. Take, for instance, the disinfectants officially prescribed by the Board of Agriculture. Where that body recommends the use of any particular disinfectants, these are a 1 per cent. minimum solution of chloride of lime, containing not less than 30 per cent. of available chloride, a 5 per cent. minimum solution of carbolic acid, containing not less than 95 per cent. of actual carbolic acid, or a disinfectant equal in disinfective efficiency to the last named solution. For the disinfection of horse boxes, cattle trucks, or any place which has been occupied by animals that may be suffering from disease—glanders or bovine tuberculosis, to mention the two specified in the article in your columns—these preparations are entirely unsuited to the work required of them. That chloride of lime becomes inoperative on contact with organic matter (which must always be present in the circumstances in question) is a matter of common chemical knowledge, and, consequently, this preparation never was adapted to disinfection of this nature. With the carbolic solution, the case is slightly different. When these disinfectants were first prescribed many years ago, the presence of phenol in the acid gave it certain disinfective properties. But with the withdrawal of the phenol for other purposes carbolic acid became a totally different commodity, and a saturated solution of the modern article possesses no disinfective action in any available exposure. It may be added that the use of pure carbolic acid is on financial grounds alone practically prohibitive.

So much for the disinfectants recommended by the Board. But, as a general rule, no particular disinfectant is specified in their orders. The Tuberculosis Order of 1909, issued in connection with the Milk and Dairies Bill, is a case in point. The owner of any premises on which there has been a tuberculous cow is required to disinfect those premises to the satisfaction of the inspector of the local authority, and, if he should fail to do so, he is guilty of an offence against the Act of 1894. How he is to disinfect the premises in question is left to his own discretion, a fact which certainly does not make for efficiency. And the same with Leaflet No. 219 on Glanders and Farcy, issued in April last. "A thorough disinfection of all places and articles which are liable to have been contaminated by the virulent discharges," and the addition of a "suitable disinfectant" to the water used for washing are recommended, though in each case the disinfectant to be used is unspecified. What I would recommend is that the Board should draw up a schedule of disinfectants suitable for particular diseases, and endeavour to frame regulations calling for the use of those disinfectants, and no others, in the diseases in question. By these means there would be some probability of the employment of those disinfectants "in the true sense of the word," upon which you rightly insist in your article.

M.D.

—*The Field.*

Calcium Salts and Rickets.

Ætiology of Rickets is discussed by Dr. Aron in the *Biochemische Zeitschrift* from the point of view of insufficiency of calcium salts in the food. By giving young and growing animals a food poor in lime salts, Dr. Aron has been able to produce bony lesions which in all respects resembled those found in the rachitic skeleton —deformities of the bones, swellings of the lower ends of the radius and femur, proliferation of the cartilaginous and periosteal zones. Chemical analysis confirmed the morphological data; the bones of these animals contain a larger proportion of water and less dry residue, and the dry residue contains less lime salts than in normal bones. There is also a further resemblance in the lime content of the other organs. In the rachitic condition and also in these animals the author finds that the other tissues of the body contain a normal proportion of lime salts. By computing the average amount of lime salts contained in human milk and the amount usually required by a growing infant, the author estimates that there is only just sufficient, and there is no margin for cases in which the milk may be poor in lime or the infant's digestive organs unable to absorb the full amount ingested. Moreover, the author finds that insufficiency of lime salts is often accompanied by an abundant supply of milk, which tends to increase the disproportion between the growth of the child and the supply of lime salts. For a child growing rapidly an extra supply of calcium salts is especially needed, and should be added in the form of tricalcium phosphate 1 gramme per day. The fact that the administration of lime salts does not appear to affect the disease, once established, does not, in the opinion of the author, militate against this theory. The same phenomenon was observed in the case of the animals experimented upon. When the lesions were established the addition of lime salts to the food only affected the condition very slowly, often after several months.—*The Hospital.*

Tincture of Iodine in Surgical Antisepsis.

Mr. J. Lionel Stretton, Senior Surgeon, Kidderminster Infirmary, writing to *The British Medical Journal* of this method, says:—"During two months I have used it in 57 cases. (These are tabulated, and include amputations, 2 breast, 1 thigh; appendicitis, hernia strangulated 1, radical 6; laporatomy 3, colotomy 3, etc.)

Where a "perfect" result is recorded, there was primary union without any suppuration, stitch abscess, or inflammation. In two cases there was some separation owing to deficient skin, which caused a granulating wound, but otherwise they healed immediately. Three of the goitre cases were discharged from hospital in a week.

The cases described as "satisfactory" (6) were septic at the time of operation. The two cases of appendicitis were suppurative ones, requiring drainage. The colostomy wound was, of course, immediately subject to fæcal contamination, and the same applies to the three colotomies, as they had to be opened immediately. All of them healed with a minimum of inflammatory trouble.

The ages of the patients varied from 2 months to 84 years. In none of them did the iodine application cause the slightest discomfort. The cases are fairly representative, and include some of the most anxious—knee-joint, fracture, hernia, etc.

If we disregard the 6 septic cases, there remain 51 consecutive successes and no failure.

The method I adopt is to paint a wide area of the surface to be operated upon with the iodine solution previous to the administration of the anæsthetic. It is painted on very freely, especially over hairy parts, and allowed to soak in. It is again painted immediately preceding the operation. After the stitches are inserted they are painted over for a margin of an inch all round.

The first and only dressing is usually made on the eighth day; the stitches are then removed, and the line of incision with a margin of 1 in. is painted with the iodine solution. If for any reason the wound requires to be inspected at an earlier date, it is painted as above described.

No previous preparation of any kind is undertaken—no bath, no scrubbing, and no shaving. The latter is an important point, because it saves the patient a good deal of after-discomfort. This is at variance with the method previously referred to, and combined with the weaker solution of iodine constitutes the difference.

The solution I use is made of 1 part of liq. iodi fort. *B.P.* and three parts of spirit. The spirit is made by mixing equal parts of spt. vini meth. and distilled water. It is practically the same strength as the tincture of the *B.P.*, but is cheaper, owing to the use of methylated spirit.

"By the Hokey Fiddle."

CRUELTY PROSECUTION AT BRAY (IRELAND).

Captain Riall, D.L., presided at Bray Petty Sessions on July 31st, and the other magistrates present were Col. Rowan-Hamilton, J. W. Reigh, R. H. Davis, and W. H. M'Farland.

William Redmond, Inspector of the Society for the Prevention of Cruelty to Animals, summoned Michael Clarke, owner, and Antony Clarke, driver, for working a horse which was in an unfit state at Shanganagh.

Clarke said that the horse suffered from "warbles." Three weeks ago one of these broke, and he kept the animal in stables until it healed. He handed in a certificate as to the condition of the horse from Prof. Mason, whom he might describe as the head veterinary surgeon in Ireland.

The Chairman remarked that the contents of the certificate clearly proved the case against the defendants, for it stated that there was a "small sore under the straddle" which exactly agreed with the inspector's evidence.

Defendants were fined 2s. and 1s. respectively.

Michael Clarke: God forgive you (laughter).

The Clerk of the Court: That will be six shillings altogether.

Clarke: Six shillings. Ah! By the hokey fiddle, that's a power of money (laughter). Why, I cannot settle with you until I get the old age pension (laughter). *Saturday Herald.*

Personal.

Mr. E. H. SCOTT, M.R.C.V.S., acted as judge of horses and dogs to the Isle of Hoy (Orkney) Agricultural Show last week.

At the West Sussex Horse Show held at Worthing on the 11th inst., Mr. Gerald Bloxsome (Hove) won first (£4) in the Open Class for Ponies in Harness, with his bay gelding "Rosebud"; whilst Mr. J. Alex. Todd was placed second (£2) with his bay mare "Erminie."

In the Jumping Classes Mr. J. Coleman's (Epsom) "White Rose" pulled off first (£10) in the United Hunts' and second (£10) in the Open; whilst nominations of the same owner won second (£5) in the United Hunts, and third (£5) in the Open competition.

Messrs. H. Smith, J. A. Todd, and J. W. Pritchard were the appointed veterinary inspectors.

ARMY VETERINARY SERVICE.

Extract from *London Gazette*,

INDIA OFFICE, Aug. 13.

INDIAN CIVIL VETERINARY DEPARTMENT.

To be Colonel:—Lieut.-Col. F. Raymond, F.R.C.V.S. Dated Dec. 14.

OBITUARY.

W. J. HELEY, M.R.C.V.S., Wing, Bucks.
Graduated, Lond: March, 1896.

CORRESPONDENCE.

THE PROPOSED VETERINARY BILL.

Sir,

I notice your article on the proposed Bill in your issue of August 7th. It is only throwing dust in the eyes of farmers and others to say that the R.C.V.S. do not desire to interfere with castrators and spayers. The present Act says "Any person who is not on the Register of Veterinary Surgeons takes or uses the title of veterinary surgeon or veterinary practitioner, or any name, title, addition, or description, stating that he is a veterinary surgeon, or a practitioner of veterinary surgery or *any branch thereof*, or is specially qualified to practice the same, he shall be liable to a fine not exceeding twenty pounds." As long as that remains as it is the R.C.V.S., or any person they like to authorise, can take proceedings against a castrator for saying he is *a castrator* and specially qualified to practice the same. Many veterinary surgeons will not castrate, and most of them can't spay, so why should men who can do the work properly be placed at their mercy.—Yours truly,

A CASTRATOR.

Hagley, Worcester.

"Throwing dust in the eyes of farmers" is the description. Not a single attempt made by the R.C.V.S. under an Act 28 years old to stop legitimate castrators is the fact.—ED.

FOUR CASES FROM A COUNTRY PRACTICE.

Sir,

In reply to "V's" letter in your last issue, we examined the blood from one of the carcases for anthrax with negative results. Since writing to you, we have had two similar cases which are recovering. One was cast with hobbles and drenched. While we were drenching her, the same serous fluid started to run down her nostrils. After running down this way for several days she began to improve, and showed signs of bilious fever.—Yours truly,

ENQUIRER.

CASTRATION OF THE HORSE.

Sir,

It was with considerable interest that I read the remarks of Mr. Barrett in your last week's edition upon the standing operation for castration, particularly as I myself am in the habit of operatlug upon between two and three hundred colts of all ages annually. I may say that I fully agree with Mr. Barrett's remarks upon this method of castration. I consider the standing position is much safer for the animal, it also enables one to perform the operation much quicker and easier than by the method of casting. Again, less help is required - an item which I find farmers and owners generally greatly appreciate. Finally, scrotal swelling and stiffness—symptoms which practically always follow the method of casting and actual cautery—are almost unknown. Indeed, I find that when once owners have had their colts operated upon standing, with the caustic clam, they will seldom have them done any other way.

As regards the complication of schirrous cord, which I believe is regarded by many veterinary surgeons as a fairly frequent sequel to this method, I may say that I have yet to see a case following the use of the caustic clam.

In conclusion, I am of opinion that if some of these veterinary surgeons who are so opposed to the standing method of castration could only see a few horses done by this method, they would have a more favourable opinion of it than they hold at the present time.—Yours faithfully,

C. W. TOWNSEND, F.R.C.V.S.

Long Stanton.